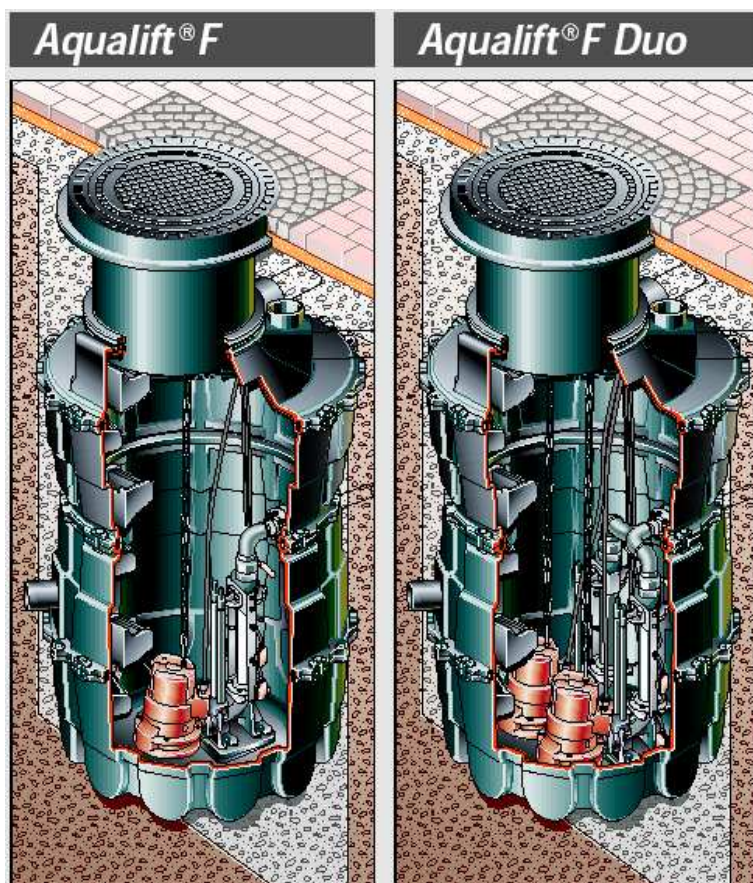


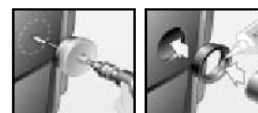
INSTALLATION AND OPERATING INSTRUCTIONS

KESSEL – Pumpstation Aqualift F / Aqualift F Duo For all wastewaters (with / without sewage) For underground / sub-surface installation.

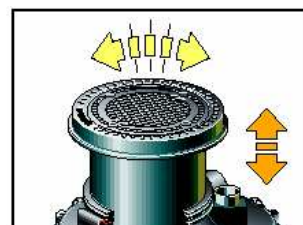


Product advantages

- Quick and easy installation due to light weight chamber
- Long-life / durable due to watertight chamber and resistance to aggressive soils / fluids
- Additional inlets easily connected on-site.



- Vertically adjustable and tiltable upper section



The installation and service of this unit should be carried out by a licensed professional servicer

Company - Telephone No.

Edition 02/2004-HG

ID number 010-607

(Subject to technical amendment)

This User's Manual should always remain with the Pumpstation Aqualift F.

Dear Customer,

thank you for choosing a KESSEL pumping station.

This entire system has passed a strict quality control inspection before leaving KESSEL headquarters. Upon delivery of the lifting station please thoroughly inspect it to make sure that it has not been damaged during shipping and that the delivery is complete.

In case damage has occurred to the lifting station or the delivery was not complete, please follow the instructions listed in the ,Guarantee section of this user's manual.

Before the KESSEL - Aqualift F Pumpstation is installed and placed into operation please carefully read and follow all of the instructions contained in this Installation, Maintenance and User's Manual.

KESSEL GmbH

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1. Safety precautions

General Safety Precautions

During installation, operation, maintenance and repair of this system it is important to follow all appropriate DIN and VDE safety precautions as well as any application precautions in your area.

Additionally the safety precautions relating to explosion risks in wastewater pumping systems must be followed. In danger areas, such as pump stations or septic systems, it is important that systems with explosion proof ratings are installed. Installation and connection of these units should only be handles by licensed, professional installers.

Qualified Personnel – Personnel responsible for the operation, maintenance, inspection and repair of this system must be fully trained and licensed. It is the responsibility of the owner or operator of this system to insure that the person(s) responsible for this system are fully trained and licensed. If this is not the case the existing personnel must be immediately trained or replaced with trained and licensed personnel. It is also the responsibility of the owner or operator to make sure that the responsible personnel have read through and are completely familiar with this User's and Maintenance Manual.



Caution - The Aqualift F uses electricity to operate rotating and mechanical parts.

Not following the User's Manual can result in damage to the unit as well as injury or a possible fatal accident.

Before maintaining or servicing the Aqualift F make sure to disconnect it from ALL power sources and secure that power cannot be re-connected during maintenance / servicing. During electrical installation or servicing of the unit, VDE 0100 and all applicable safety regulations should be followed.

The control unit and pressure sensor switch are electrically powered systems which should not be opened or serviced except by licensed professional electricians. Licensed professional electrician is defined in VDE 0105.

It is important that all electrical cables and units relating to the Aqualift F are always in good operating condition. If damage to any of the electrical cables or systems of the Aqualift F are noticed, the Aqualift F unit must be immediately disconnected and taken off line.



Danger of hot surfaces - During operation, the Aqualift F can become hot. Take caution before touching or coming into contact with all hot surfaces on the Aqualift F.

Danger for hands and fingers - The Aqualift F pump is equipped with a closed impeller. Any inspection or maintenance work must take place after the Aqualift F has been fully disconnected from its power source. Also, during maintenance and inspection take caution of any sharp surfaces or edges.

Slip / Crush / Fall dangers – Due to risks during entry into the pumping station chamber, it is important that a second party remain outside of the chamber and oversee the person entering and performing work on the pumping system.

1. Safety precautions

Heavy weight - Caution

KESSEL Aqualifts with single pumps weigh approximately 45 Kg (approx 100 pounds) and double pump systems weigh approximately 84 Kg (approx. 185 Kg). The Aqualift F units should be handled by at least two people equipped with appropriate equipments (e.g. safety shoes, back support).

Health Safety

The Aqualift F is designed to pump wastewater containing untreated / raw sewage which can cause health hazards. It is important that no direct or indirect contact between the Aqualift F and skin, eyes or mouth occurs. If contact does occur it is important to immediately wash and disinfect the contaminated area. Also, in cases when the pump itself is to be removed from the Aqualift F, make sure that the room is properly ventilated to allow and methane or biogases to escape or be diluted.

Noise

During operation of the Aqualift F emits approximately 65.5 dB. Based on the installation of the Aqualift F this could present an unwanted noise. Take care in selecting the installation location of the system. A vibration dampening support matt (available from KESSEL) may be placed underneath the Aqualift F to reduce noise / vibration.

Pump operation

Before placing the pump(s) into operation please observe the conditions on site. The use and operation of the pumps must be in accordance with explosion proof regulations.



Dry-running or semi-submersion of the pumps must not occur! The cutting blades, impeller and pump housing must always be submerged underwater

- The minimal submersion level must always be maintained!
- The pump(s) may not be placed into operation when people are located in the wastewater storage area of the pumping systems.

Surrounding conditions / lighting

Any additional equipment brought into the pumping station (such as external lighting or power tools) must be equipped with the explosion proof rating.

Marking codes of explosion proof items (such as the pump and control unit) are labelled as follows:

EX

2. General

2.1 Application / Installation

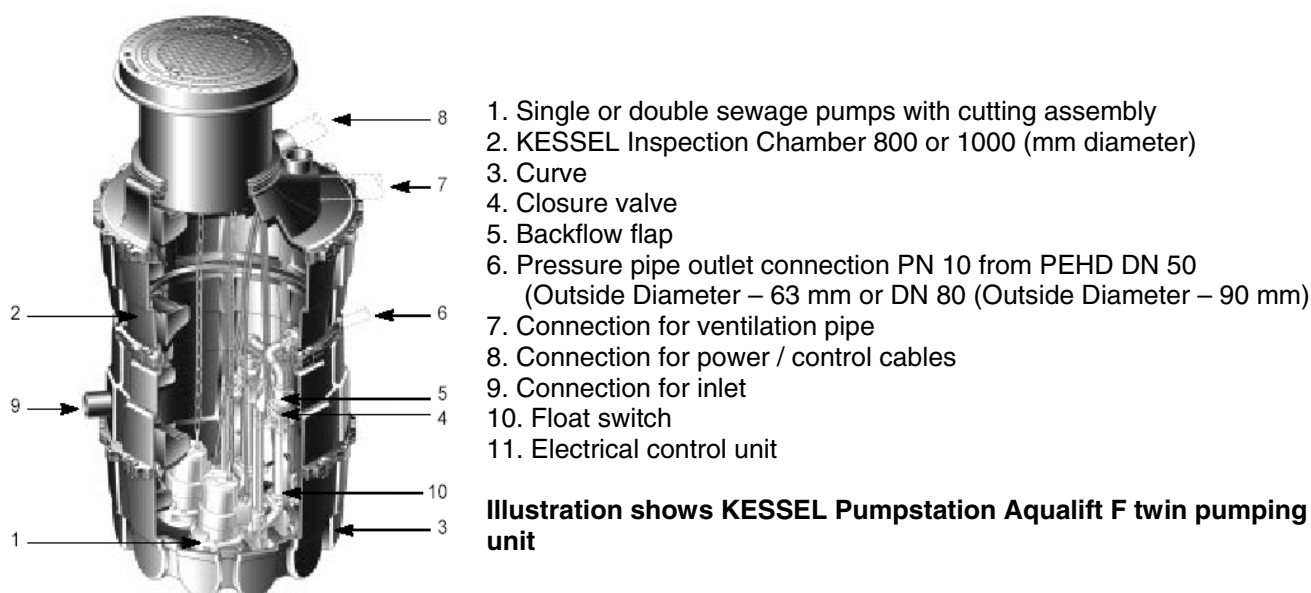
The Aqualift F is designed to pump wastewater (with or without sewage collected below the outgoing sewer level) up to the sewer level so that it may flow with gravity out of the building and into a septic system / public sewer piping. Installation examples of the Aqualift F would be single and multi-family homes, commercial buildings, hotels, restaurants, hospitals, schools or similar buildings. In circumstances where the interruption of wastewater is not allowed or desired, a twin pump system (Pumpstation Aqualift F Duo) is required for installation.

The KESSEL Pumpstation Aqualift F is designed for outdoor underground installation. Pumps are equipped with cutting blades which macerate all soft objects into smaller pumpable pieces. Due to the cutting blades, outlet pipes of DN 40 or larger may be connected to the outlet of the Pumpstation Aqualift F. Objects foreign to wastewater piping (such as utensiles, wood, plastics . . .) should not come in contact with the pump's cutting assembly. The system is designed to handle continuous inflow of wastewater up to 40 deg C (104 deg F).

The Aqualift is designed constant usage with wastewater at 35 deg C (95 deg F) and can also handle for short durations (max 10 minutes) temperatures up to 60 deg C (140 deg F)

2.2 Aqualift F description

The KESSEL Pumpstation Aqualift F in single or twin pump variations is mainly comprised of the following systems.



Options for the KESSEL Pumpstation Aqualift F include:

- Single (1 pump) or Twin (2 pumps)
- Pumps with 1.33 kW or 2.66 kW
- In KESSEL 800 or 1000mm diameter Inspection Chamber
- Installation depths from 1.5 to 5 meters.

The closure valve, backflow flap, outlet pressure pipe and float switch have already been installed in the base of the chamber. The pump(s), additional chamber sections and the electrical control unit are shipped separately packaged with the system. The pumps, depending on their size, are shipped either in the chamber upper section or on a separate pallet. The pumps are to be installed only after the complete chamber has been completely assembled and installed. In order to prevent the build up of dangerous gases in the chamber which can cause an explosion risk, the system must be ventilated appropriately.

3. Technical data

3.1 Explosion proof pumps according to ATEX

| Type | TPF 120 KE | TPF 154 KE |
|------------------------------|---|---|
| Power consumption P1 | 1,33 kW | 2,63 kW |
| Power consumption P1 | 1,05 kW | 2,13 kW |
| Operating voltage | 400 V DS | 400 V DS |
| Frequency | 50 Hz | 50 Hz |
| Current | 2,5 Amps | 4,4 Amps |
| Cables | 10 m Length 7 x 1,5 mm ² | 10 m Length 7 x 1,5 mm ² |
| Fuses | 3 x 16 Amps | 3 x 16 Amps |
| Protection | IP 68 | IP 68 |
| Wastewater temp. | 40 ° C | 40 ° C |
| Protection | IP 68 | IP 68 |
| Max running time at 40 deg C | 640 minutes (see settings in chapter 5.7) | 640 minutes (see settings in chapter 5.7) |
| Pump weight | 49 kg | 59 kg |

CE 0102 II 2G EEx d IIB T4 PTB 03 ATEX 1140

Classifications:

Operating modes

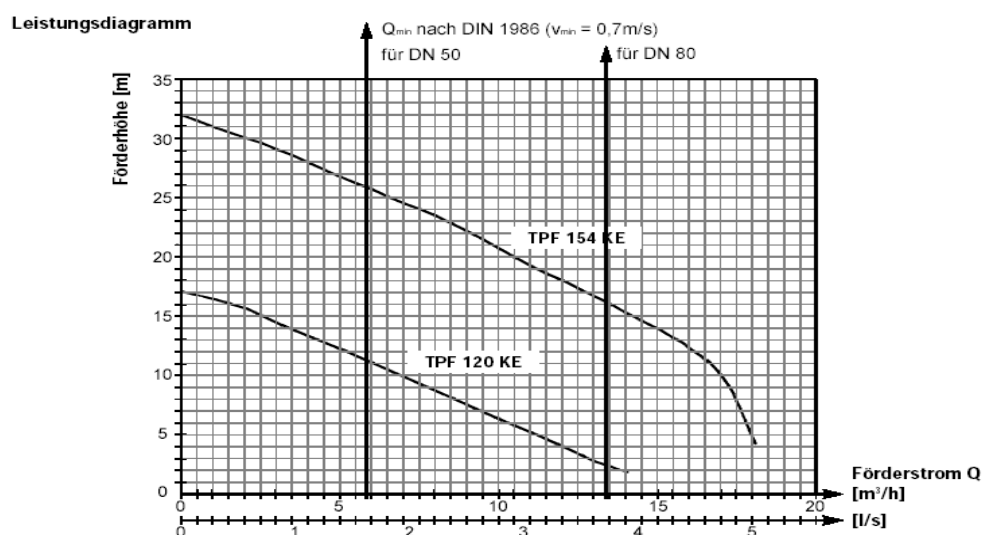
Pump submerged – Continuous run (S1)

Pump not submerged – Periodic run S3, 25%

(2,5 minute run, 7.5 minute pause with ambient temperature of 40 deg C (104 deg F))

Pumps with the TES . . . ex identification according to Unit Group II, Unit Category 2G (Explosion endangered areas Zone 1 and 2) are designed for installation in atmospheres containing dangerous gases which require the Explosion Group IIB and the Temperature Class T4. Pumps constructed according to this designation comply with the ignition protection type 'pressure protection encapsuled'.

Power Curve



4. Technical data

3.2 Switching levels. Separate power source with blue cables and float switches

| | Chamber 800 | | Chamber 1000 | |
|-------------------------|-----------------|------------------------|-----------------|------------------------|
| | Pumping Vol (l) | Height difference (cm) | Pumping Vol (l) | Height difference (cm) |
| Single Pump Unit | | | | |
| Off – On | 100 | 18 | 180 | 18 |
| On – Alarm | 110 | 20 | 200 | 20 |
| Double Pump Unit | | | | |
| Off – On1 | | | 180 | 18 |
| On1 – On2 | | | 100 | 10 |
| On2 – Alarm | | | 100 | 10 |

The alarm levels are at the approximate level of the inlet.

3.3 Electrical control unit with separator power source according to ATEX.

3.3.1 General technical data

Required Fuse – max 16 Amp / phase (sourced on-site)

3.3.2 Protection

IP 65 – based on appropriate installation and securely closed see-thru cover

IP 21 – without see-thru cover and standard wall installation

3.3.3 Appropriate use

Information concerning the appropriate use of the control unit in areas at risk of explosion.

The control unit is designed to operate KESSEL single or double pump lifting stations with the use of float switches. The control unit is not to be installed in an area designated as at risk of explosion.

Classifications

II.1)G (EEx ia) IIC/IIB (Group II, Category (1)G, designated for use in gaseous atmospheres)

The requirements of Norms EN 50014:1997 + A1 – A2, EN 50020:2002 have been fulfilled.

EG – Certification

PTB 03 ATEX 2133

Identification

II)1) G (EEx ia) IIC/II CEO123 Ta= 0 ...+ 50°C

Installation / Commissioning

The lifting stations must be installed, connected and commissioned by a licensed professional. This professional must be trained and certified in areas including types of ignition, regulations and work in areas at risk of explosion. Check to make sure that the pump classification (listed above) satisfies the requirements of the installation area.

Temperatures in the immediate area of installation must be between 0 – 50 deg Celsius (32 – 122 def F).

3. Technical data

Electrical data / Connections

| | |
|--|---|
| Power supply – | 3 x 400 Volt (AC) / 50 Hz +- 10% |
| Jacks – N, L1, L2, L3 PE) | 230 V (AC) / 50 Hz +- 10% to supply electronics Um = 253 V Based on type – max 11 VA (Electronic with protection) up to max 16 VA (Electronic with protection) |
| Incoming power (jacks TF, TF1, TF2, E7, E8, E9, E10, based on model) | Switch contact U=24V, I=20mA PTC – switch Um = 253 V |
| Exiting power (Jacks N, L1) (Jacks L1, L2, L3) | U = 230 V +- 10%, 2A, 50 Hz (Warning, Relay) Um = 253 V U = 400 V +- 10%, less then or equal to 4KW, 50 Hz (motor protection switch). |

Control unit power circuit passive (Control unit and buttons)

Single pump lifting station

| | |
|----------------------|---|
| Power level circuit | in ignition protection characteristics EEx ia IIC / IIB |
| Jacks OFF, ON, ALARM | Highest values: Uo = 15,8 V Io = 22 mA Po = 86 mW linear curve |

Maximum effective interior inductiveness and capacities are minimal

| Eex ia | IIC | IIB |
|---|--------|---------|
| highest certifiable exterior inductivity | 73 mH | 290 mH |
| highest certifiable exterior conductivity | 478 nF | 2,88 uF |

If concentrated capacities / capacities exist in the power level circuit the following highest certifiable values should be used.

| Eex ia | IIC | IIB |
|---|--------|--------|
| highest certifiable exterior inductivity | 2 mH | 5 mH |
| highest certifiable exterior conductivity | 420 nF | 1,8 uF |

Double pump lifting station

| | |
|----------------------|--|
| Power level circuit | in ignition protection characteristics EExja IIC / IIB |
| Jacks OFF, ON1, ON 2 | Highest values: Uo = 18,8 V Io = 29 mA Po = 115 mW linear curve |

Maximum effective interior inductiveness and capacities are minimal

| Eex ia | IIC | IIB |
|---|--------|---------|
| highest certifiable exterior inductivity | 42mH 2 | 168 mH |
| highest certifiable exterior conductivity | 478 nF | 2,88 uF |

If concentrated capacities / capacities exist in the power level circuit the following highest certifiable values should be used.

| Eex ia | IIC | IIB |
|---|--------|--------|
| highest certifiable exterior inductivity | 2 mH | 5 mH |
| highest certifiable exterior conductivity | 410 nF | 1,8 uF |

3. Technical data

Installation / Assembly

All appropriate local and national codes must be followed

- Regulations (including safety regs) concerning the installation must be followed
- Also consider the installation and assembly instruction of non- ATEX relevant units

Maintenance

Removal of the see-thru control unit cover reduces the water / moisture proof effectiveness of the control unit. In the case that the control unit is in very moist, humid or splash endangered area, make sure to disconnect power to the control unit before handling or maintenance work is attempted. Removing the cover of the control unit should only be done by a licensed service professional.

- After maintenance is completed on the control unit, it is important that the control unit cover is properly closed and secured.
- No changes should be made to the control unit – such as removal of the protective see-thru cover. In the case that the control unit does not function or is damaged, please contact the manufacturer.
- If required, data sheets, EG – certifications, User's Manuals and EG conformity certifications can be requested from the manufacturer

3.3.4 Control unit outputs

'Malfunction' relay

Change over contact; opener, middle contact, closer each with max 2A

'Alarm' relay

Change over contact; opener, middle contact, closer each with max 2A

Power

2 x N max. 2A each

2 x L1 max. 2A each

Motor (single pump unit)

Motor PE Power connections (grey double inlet jack)

Motor U T1 Protection

Motor V T2 Protection

Motor W T3 Protection

Motor ½ (double pump unit)

Motor ½ PE Power connection
quadruple power jacks

Motor ½ U T1 protection ½

Motor ½ V T2 protection ½

Motor ½ W T3 protection ½

4. Installation

When the shipment arrives, please inspect it immediately for damages which may have been caused during transport / shipping!

The delivered shipment should include the following:

- KESSEL Inspection Chamber delivered in sections (for assembly on-site)
- Sewage pump(s)
- Electrical Control Unit

Caution The base of the inspection chamber as well as the pumps and chamber cover each way over 30 kg! Be sure that appropriate personel and equipment (e.g. safety shoes, back support, etc.). The pumps should be placed into the chamber after the chamber is installed and lowered into the chamber only with an appropriate winch / lowering assembly.

Important After the receiving the Aqualift F but before installation, it is important that the control unit is stored in a dry, frost free area until time of connection. The cable ends of the float switches must not come in contact with water while they are being stored.

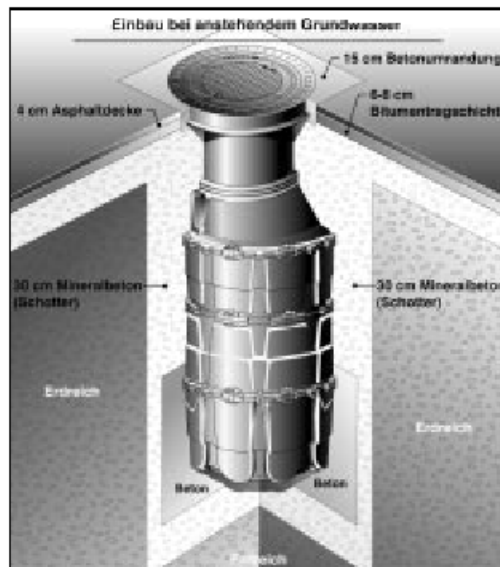
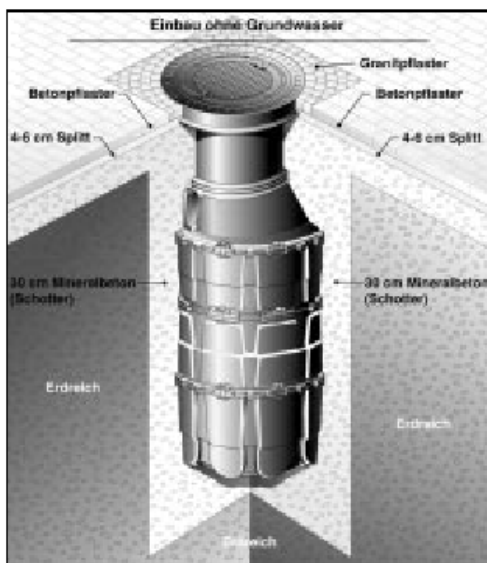
Caution - Danger of slipping While enterring or working in or around a chamber the danger of slipping is always present. Due to this it is mandatory that a second worker always remains outside of the chamber to aide / observe the other.

Caution – Danger of tipping Before the trench / hole is backfilled with soil, the possibility that the chamber tips or falls is always present. Due to this, entry into the chamber should only take place after the hole, in which the chamber is installed, is backfilled.

4.1 Installation

The base / bottom of the hole in which the Aqualift F is to be installed should be prepared with 30 cm even layer of compacted gravel. On top of this layer of gravel should be a 10 cm thick evenly compacted layer of fine gravel. Now place the bottom section of the pumping chamber into the excavation making sure that inlets / outlet, ventilation and pipe cable outlets are in the correct location.

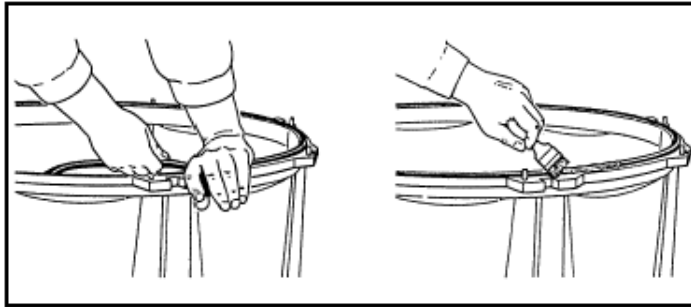
The excavation is then to be backfilled in 30 cm layers with gravel (no sharp stones allowed)(gravel to be group G1 according to ATV-A127). Each of these 30 cm layers is to be compacted. Make sure to connect any necessary inlets / outlet or other pipes before these areas are backfilled. In the case that the chamber is to be installed in an area that is subject to rising groundwater, the chamber must be protected against floatation. To protect the chamber against groundwater the entire lower portion of the chamber (including the bottom of the chamber)(up to a height that is higher than the highest possible groundwater level) must be covered / surrounded by concrete. To help anchor the chamber, 10 mm steel anchor rods (hooks) (as seen in the illustration) must be installed.



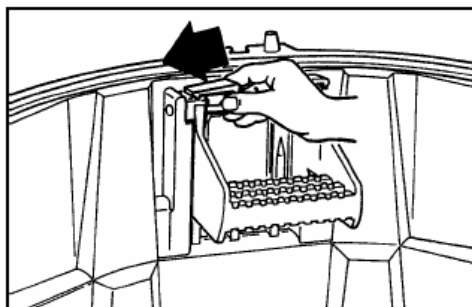
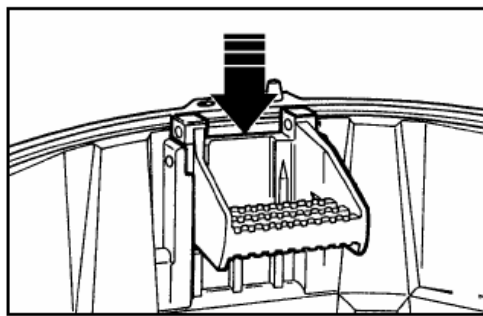
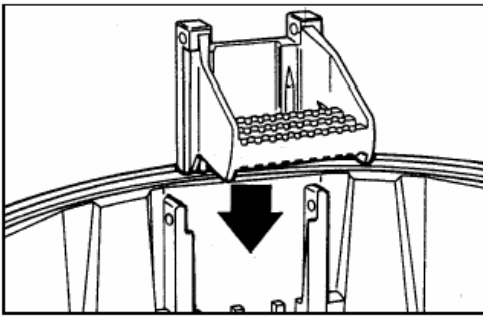
4. Installation

Installing the chamber seals / gaskets

Each of chamber sections is connect using a gasket (the size of this gasket will vary depending on if an 800 or 1000 chamber is being installed and on the specific section being installed). The recessed area for the gasket (located on the top of each section as seen in the illustration) should be clean and free from all debris / sand. Firmly place the gasket into the recessed area of the chamber. After the entire gasket has been installed – grease the gasket with a standard gasket lubricant. Insert an access step if desired (KESSEL 1000 chambers come standard with access steps – steps for the 800 chambers are available upon request).



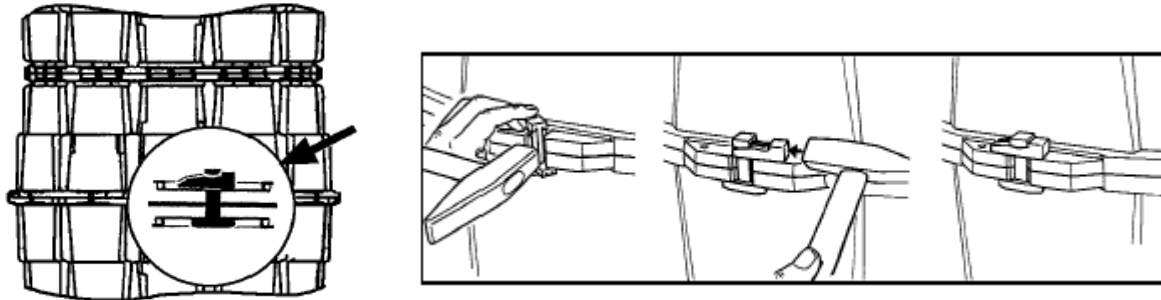
Access steps (only standard with KESSEL 1000 chamber)



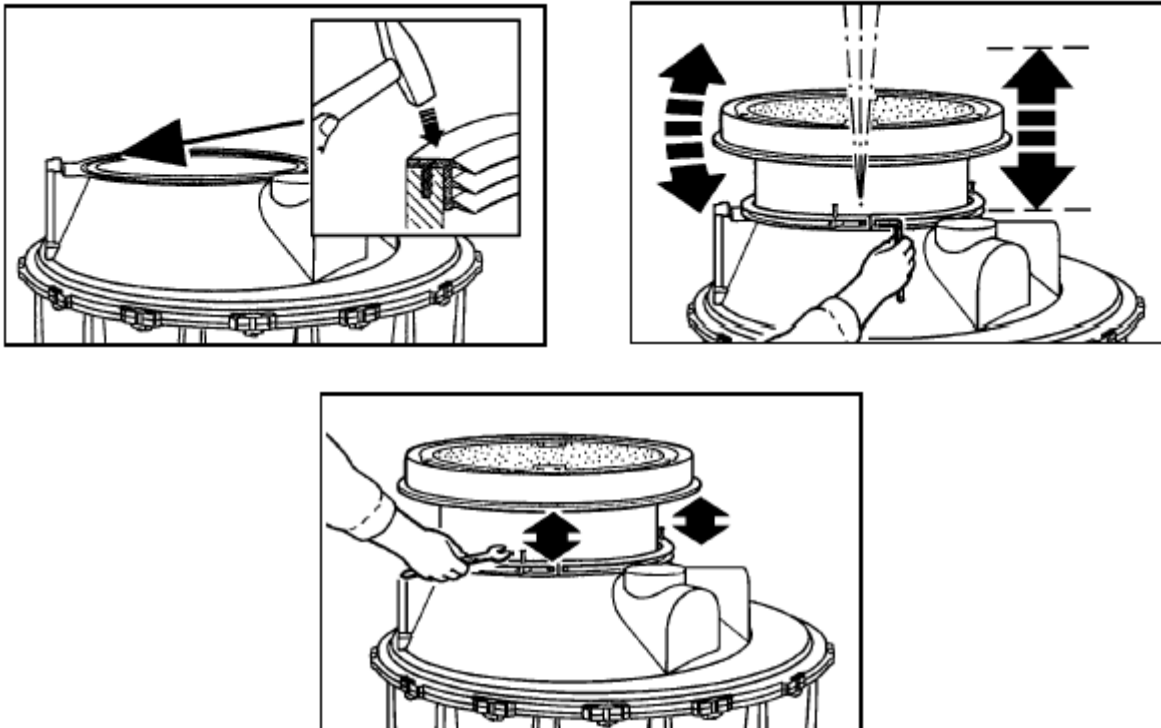
4. Installation

Installing chamber sections

Now place the next chamber section on top of the other making sure that the location for access steps are in line with the lower portion. The sections are secured with another with the supplied connection clips which should be installed as illustrated.



Installation of the vertically adjustable upper section:



Installing the vertically adjustable upper sections.

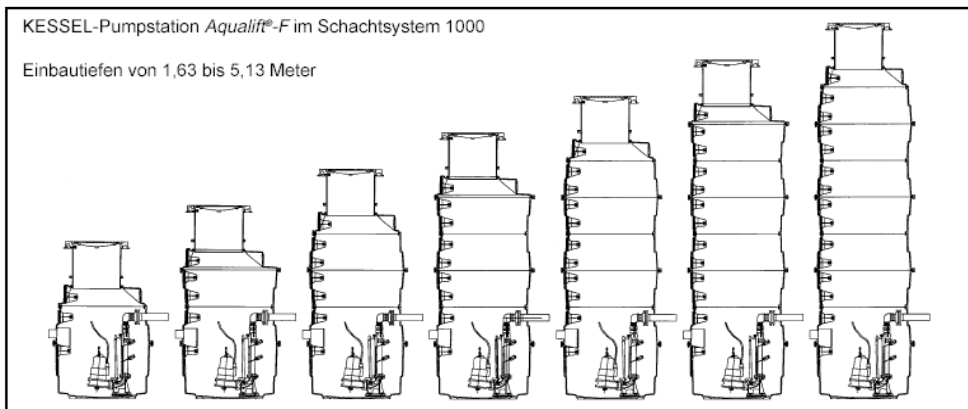
- Firmly insert custom gasket into cone section using hammer if required
- Grease custom gasket, insert upper section and secure with clamping ring
- Final elevation / slope adjustments can be made with the 3 adjustment screws

4. Installation

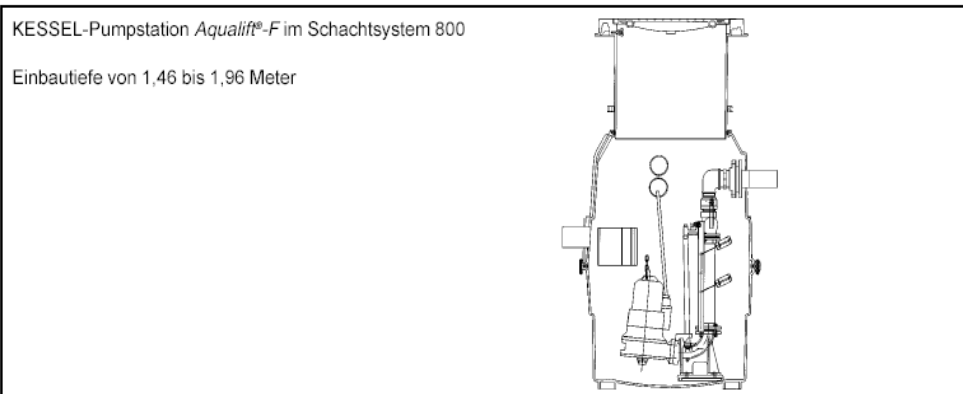
After the upper section has been set to its final elevation and slope, it is important to note the following:

- Cobble stone installation – in the case that the upper section and cover will be installed in a stone / cobble stone surface, it is important that the top of the upper section is placed approx 2 cm higher than that of the cobble stones. When the cobble stones are compacted the upper section and cover should also be compacted (be sure to tighten cover screws before compacting) until it is level with the surrounding stones.
- Installation in automobile traffic areas – in the case that the upper section and cover will be installed in a surface which is to handle Class D (40.0 metric ton load classes), a 18cm thick, 2m x 2m concrete support plate must be poured around the upper section. The concrete support plate should be steel re-enforced and comply with any local regulations. A sample drawing of this load support plate is available from KESSEL.
- In some instances it may be required that the lower section of the upper section be sawed off in order to obtain the correct installation depth. This cut should be made as evenly as possible and any remaining loose edges should be filed away. The included manhole cover removal key as well as the User's Manual for the pumping system should be stored in a protected dry area in the near vicinity of the control unit.

KESSEL – Pumpstation Aqualift F in 1000 Inspection Chamber
Installation depths from 1.63 to 5.13 meters



KESSEL – Pumpstation Aqualift F in 800 Inspection Chamber
Installation depths from 1.46 to 1.96 meters



4. Installation

4.2 Pipe connections

All pipes are to be laid with negative slope into the Pumpstation Aqualift F Chamber – meaning that fluids will flow with gravity out of the pipe and into the Pumpstation. All pipe connections must be flexible connections and be installed with sound dampening accessories. The DN 100 pipe connections for the inlets, ventilation and cable supply can be made with standard DN 100 KG piping.

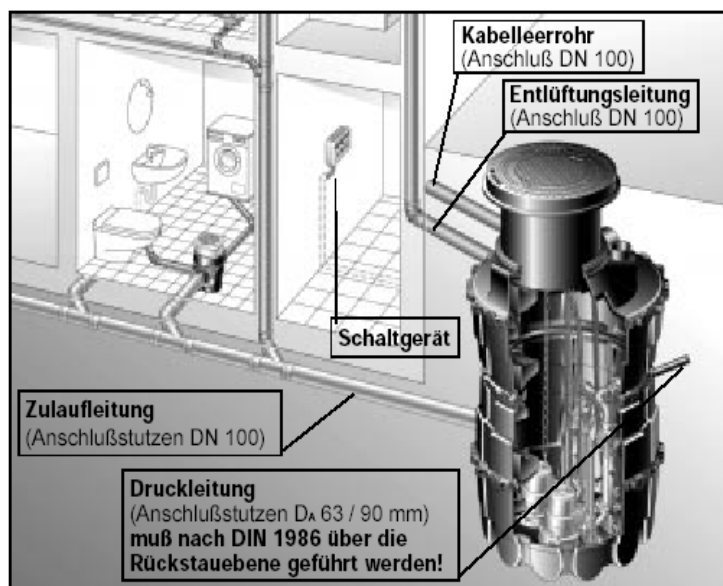
According to DIN 1986 the inlet pipe(s) must have a minimum 2 % slope into the Pumpstations. Bends and fittings should be used as little as possible. The connection to the DN 100 inlet to the Pumpstation can be made with a female-female fitting.

All electrical cable going to or from the Pumpstation should be installed in one cable supply pipe. This cable supply pipe may be used for no other purpose other than running cables. Curves / Bends in the cable supply pipe should be handled with 30 or 45 degree fittings (no 67 or 90 degree bends should be used which could complicate running cables at a later date). After all electrical installations have been completed it is important that the cable supply pipe is completely seals against air or waste penetration. This can be accomplished with specials cable sealing inserts or with special expansion foams.

The ventilation pipe serves to compensate vacuums or pressure build-ups which can occur inside the Pumpstation as it is filled with wastewater or as wastewater is pumped out of the system. Since these systems are normally installed close to the building which they serve, it is recommended that the Pumpstation's ventilation pipe be run to the roof of the building – this will prevent odor nuisances in the future. If the opportunity exists, the Pumpstation's ventilation pipe can be connected to the building's existing ventilation pipe.

The Pumpstation is shipped with installed inlet and ventilation port inlets including gaskets. These should be used for connection of the inlet and ventilation pipes. These gaskets should be lubricated before KG inlet and ventilation piping is attached.

The outlet pressure pipe (connected to a private or public sewer system) should be connected to the supplied outlet using PN 10 PEHD DN 50 (OD 63mm) or DN 80 (OD 90mm) piping. This connection can be made by welding the plastic together or by using appropriate heavy duty couplings. It is important that this outlet pipe be plumbed over the local backwater height and then down into the private or public sewer. A direct solid connection from the pressure pipe outlet to the building should not exist – this will prevent noise / vibrations being transferred to the building.



4. Installation

4.3 Installation of the submersible pump(s).

Caution – the Aqualift F submersible pumps weigh between 49 and 59 kg. These pumps should only be lifted and installed in the Pumpstation using appropriate lifting and pulley devices. If an installation or maintenance worker needs to enter the Pumpstation there should always be at least one observer who remains outside of the chamber.

Before installing the submersible pumps(s) check the inside of the Pumpstation to make sure it is free of any debris or waste. Once the chamber is cleaned, the pump(s) should be lowered with the aid of a mechanical lowering device (pulley) onto the steel guide bars and to the bottom of the chamber making sure that the pump(s) make firm contact with the bottom of the guides. Remove the lowering chain from the pulley and attach it to the hook located in the upper section of the chamber.

Important – After installing the pump(s) make sure that the closure valves are in the open position (lever should be in the vertical position).

4.4 Setting the float switches

Single pump unit

This Pumping station is equipped with one submersible sewage pump. The system is controlled by 3 float switches. The function of these 3 float switches are Pump OFF, Pump ON and ALARM. The float switches have been installed and set at the factory. The float switches have been set so that the ALARM float switch will activate when the wastewater level inside the chamber reaches the bottom of the inlet pipe level of the pumpstation.

If other pumping levels are desired, the float switches must be changed on-site. Important is that the ALARM float switch activation point is not set above the inlet pipe elevation and that the Pump OFF float switch is not set too low – this will prevent the pump from intaking air. Ideally, the submersible pump should be totally underwater before pumping begins.

Double pump unit

This Pumping station is equipped with two identical submersible sewage pumps. The system is controlled by 4 float switches. The function of these 3 float switches are Pump OFF, Pump 1 ON, Pump 2 ON and ALARM. The float switches have been installed and set at the factory. The float switches have been set so that the ALARM float switch will activate when the wastewater level inside the chamber reaches the bottom of the inlet pipe level of the pumpstation.

If other pumping levels are desired, the float switches must be changed on-site. Important is that the ALARM float switch activation point is not set above the inlet pipe elevation and that the Pump OFF float switch is not set too low – this will prevent the pump(s) from intaking air. Ideally, the submersible pump should be totally underwater before pumping begins.

5. Electrical connections

NOTICE – Only certified licensed professionals should conduct the following electrical connections.

5.1 General instructions

The control unit for the Pumpstation Aqualift F must be connected to a separator main switch so that if required the entire system can be switched off line.

All cables entering the control unit must be secured to the control unit using the supplied plastic strain relief nuts. Cable inlet openings into the control unit which are not used must be properly closed.

Important – All electrical cables must be properly secured (with tie-wraps for example) so that in the case that the cable releases from the control unit that the bare ends of the cables do not come in contact with any other cables (for example in the case that cable L1 comes out of the input jacks it will physically be impossible for this cable to contact the PELV).

All local and national safety regulation should be followed. If these codes are not strictly followed, a danger to people and maintenance worker could exist. After any work on the control unit has been completed, the see-thru cover must be properly secured (touch and spray water proof).

The cable for the control unit (especially the float switch cables) must be kept separate from the power and pump cables to prevent interference.

5.2 Mounting of control unit

The control unit for this pumping station is to be installed in a frost-free, dry and well-ventilated area. The control unit may not be installed in an explosion endangered area. The control unit is to be installed on a solid wall. Screw holes can be drilled using the available template. To access the control unit mounting screws first remove the see-thru cover. The cables for the pump(s) and the float switches should be run through an empty pipe to the control unit. To connect these cables please follow the instructions in Chapter 5.4 'Installation – Cable connection'.

5.3 Information concerning explosion protection

When connected cables inside the control unit make sure that the cables are connected to their appropriate jacks. Float switch cables must be connected to float switch jacks and power and pump cables must be connected to their appropriate jacks. Improper connection of cables could damage the system as well as nullify the explosion proof rating of the system.

5.4 Installation – Cable connection

The cables for the pump(s) and the float switches are 10 meters in length. The cables between pumping station and building must be run in a empty pipe (as discussed in Chapter 4.2). In the case that the 10 meter cable lengths is not sufficient, the cables may be extending following VDE codes.

Important – All electrical cables must be installed so that they do not come in contact with the submersible pump(s) and are clear of the access steps. The cables must also be installed to allow the removal of one or both of the submersible pumps for inspection and / or maintenance purposes.

5. Electrical connections

Cable connections for pumpstation Aqualift F single pump unit

Power cable connections.

1. Power cables L1, L2, L3, N and PE should be connected to their appropriate jacks (grey color jacks located on above level). Please see the color coded installation help located near the connection area.
2. It is mandatory that cables N and PE are connected and connected properly.
3. The power supply cable to the control unit must be equipped with a main On / Off switch.
4. Each phase of the main power cable must be equipped with a fuse with a max rating of 16 Amps.
5. Improper electrical installation / connection of the control unit and / or pumps can damage or destroy the control system.

Motor / pump cables.

- The motor / pump cables U/V/W should be connected to the ABB-Schütze B6-30-10 jacks T1 / T2 / T3 which are to the left of the motor protection switches. The direction of rotation of the motors is to be noted.
- The PE cable is to be connected to the lower level of grey jacks according to the coded installation help located near the connection area.
- The motor cables must be connected so that removal of the pump(s) for repair or maintenance is possible.

Motor temperature sensors.

- ✓ Entry TF: Cable 4 from Pump 1 should be connected on the right in entry TF. Cable 5 should be connected to the left of entry TF.

Entry TF: Cable 4 from Pump 1 should be connected on the right in entry TF. Cable 5 should be connected to the left of entry TF.

- ✓ Entry E7: Cable 6 from should be connected on the left in entry E7. (remove the bridge if necessary).

Float switch connections - 'Off', 'On' and 'Alarm'

- The cable ends of the float switches are to be connected to their corresponding marked jacks.
- No other cables or power sources should be connected in the jacks for the float switches.
- The connection jacks are marked with switching symbols.

Outputs L1 / N (230 Volt / 50 Hz)

The L1 and N outputs (2 each) are designed for an external (extra) warning for the 'Malfunction' and 'Alarm' functions. These outputs may not be used for any other purposes.

Rechargeable battery.

6. A NiCd-9V-Block rechargeable battery (Type IEC 6F22) is to be used inside the control unit. The purpose of this battery is to power the alarm and notification devices on the control unit during power outages / failures.
7. Only remove or replace the battery in the control unit when the power to the entire control unit has been turned off / disconnected.
8. In the case that a 'dead' or power-less rechargeable battery is placed in the control unit, the unit will require approximately 36 hours to completely re-charge the battery. After this 36 hours the battery and the control unit will be fully operational.

5. Electrical connections

Cable connections for pumpstation Aqualift F double pump unit

Power cable connections.

6. Power cables L1, L2, L3, N and PE should be connected to their appropriate jacks (the second row of jacks from the bottom). Please see the color coded installation help located near the connection area.
7. It is mandatory that cables N and PE are connected and connected properly.
8. The power supply cable to the control unit must be equipped with a main On / Off switch.
9. Each phase of the main power cable must be equipped with a fuse with a max rating of 25 Amps.
10. Improper electrical installation / connection of the control unit and / or pumps can damage or destroy the control system.

Motor / Pump cables.

- The motor / pump cables U/V/W x 2 should be connected to the ABB-Schütze B6-30-10 screw jacks T1 / T2 / T3 (Pump 1 left, Pump 2 right). The direction of rotation of the motors is to be noted.
- The PE cable is to be connected to the upper of jacks according to the coded installation help located near the connection area.
- The motor cables must be connected so that removal of the pump(s) for repair or maintenance is possible.

Motor temperature sensors.

- ✓ Entry TF1: Cable 4 from Pump 1 should be connected on the right in entry TF1. Cable 5 should be connected to the left of entry TF1.
 - ✓ Entry TF2: Cable 4 from Pump 2 should be connected on the right in entry TF2. Cable 5 should be connected to the left of entry TF2.
- Entry E7: Cable 6 from Pump 1 should be connected on the left in entry E7. (remove the bridge if necessary).
- Entry E8: Cable 6 from Pump 2 should be connected on the left in entry E8. (remove the bridge if necessary).

Float switch connections – 'Off', 'On 1', 'On 2' and 'Alarm'

- The cable ends of the float switches are to be connected to their corresponding marked jacks.
- No other cables or power sources should be connected in the jacks for the float switches.
- The connection jacks are marked with switching symbols.

Outputs L1 / N (230 Volt / 50 Hz)

The L1 and N outputs (2 each) are designed for an external (extra) warning for the 'Malfunction' and 'Alarm' functions. These outputs may not be used for any other purposes.

Rechargeable battery.

9. A NiCd-9V-Block rechargeable battery (Type IEC 6F22) is to be used inside the control unit. The purpose of this battery is to power the alarm and notification devices on the control unit during power outages / failures.
10. Only remove or replace the battery in the control unit when the power to the entire control unit has been turned off / disconnected.
11. In the case that a 'dead' or power-less rechargeable battery is placed in the control unit, the unit will require approximately 36 hours to completely re-charge the battery. After this 36 hours the battery and the control unit will be fully operational.

5. Electrical connections

5.5 Impeller / Motor rotation

Before placing the Aqualift F into operation, check to make sure that the rotation of the motor / impeller is correct. An arrow on the pump housing shows the correct direction of rotation. If the impeller turns in the wrong direction either switch L1 with L2 or switch L2 with L3.

5.6 Motor protection switch

The motor protection switch must be set to handle the appropriate power rating listed in Chapter 3.1 of this User's Manual.

5.7 Pump configuration control

The control of the pump configuration is set at the factory using switches S601 . . . S604 located between the jacks for the float switches and the motor thermal protection entry ports. The configurations should be checked to make sure they are properly set.

The configuration can be set by adjusting the S604 switch (4-way DIP switch each with ON/OFF setting). **Different settings are not permitted.**

S604/1 level controlled OFF OFF
S604/2 with OFF level switch OFF OFF
S604/3 rotation monitor on ON ON
S604/4 anti-blocking function on ON ON

S604/1 level controlled OFF OFF
S604/2 without OFF level switch ON ON
S604/3 rotation monitor on ON ON
S604/4 anti-blocking function ON ON

The pump start delay time can be custom set by adjusting the S601 switch. This delay can be set

| S601 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| t _v [s] | 0,0 | 0,2 | 0,4 | 0,6 | 0,8 | 1,0 | 1,2 | 1,4 | 1,6 | 1,8 | 2,0 | 2,2 | 2,4 | 2,6 | 2,8 | 3,0 |

between 0 and 3 seconds in 0.2 second increments. (tolerance +- 0.1 seconds)

The maximum running time can be custom set by adjusting the S602 switch. This can be set between 40 and 640 minutes in 40 minute increments (tolerance +- 4 minutes)

| S602 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----------------------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| t _{GL} [min] | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 |

The pump stop delay time can be custom set by adjusting the S603 switch. This can be set between 0.5 and 8 seconds in 0.5 second increments (tolerance +- 0.1 seconds)

| S603 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| t _{II} [s] | 0,5 | 1,0 | 1,5 | 2,0 | 2,5 | 3,0 | 3,5 | 4,0 | 4,5 | 5,0 | 5,5 | 6,0 | 6,5 | 7,0 | 7,5 | 8,0 |

Before making any of the above adjustments make sure to disconnect the Aqualift F from its power source. Any setting changes should be handled by a licensed professional and should be documented in this User's Manual.

Make sure that the pump control switches (Hand – 0 – Auto) are switched to the 'Auto' setting.

5.8 Completion of electrical work

After all electrical work has been completed on the Aqualift F or the control unit make sure replace the cover and the transparent cover of the control unit.

6. Commissioning

6.1 General instructions

Please follow DIN 1986 Part 31 when commissioning pumps / lifting stations

Caution - Before commissioning the Aqualift F make sure that all inlet pipes as well Aqualift F storage chamber and the pump is free from metal, sand or any other potentially damaging debris.

Only place the Aqualift F into operation after it has been thoroughly checked to assure that installation and pipe and electrical connection have been properly made. Make sure that all closure valves are fully open before starting.

Important - the commissioning of the Aqualift F must be handled by a licensed professional.

Make sure to follow all safety instructions in Part 1 of this User's manual and do not place the Aqualift F in operation if the pump, control unit or cables show any signs of damage.

Important - All screws / bolts should be tighten to a maximum of 3 Nm

6.2 Description of operation

6.2.1 'Auto' mode

Single pump unit

The single pump Pumpstation Aqualift F is in standard operating mode when the control unit switch is set to 'Auto' and no failures or warnings are displayed. As the wastewater level inside the Aqualift F storage chamber rises the level will reach the 'Pump Off' level and then reach the 'Pump On' level. After the wastewater level has reached the 'Pump On' level and after the pump start delay time has elapsed the pump will begin operation. As the wastewater level decreases the 'Pump Off' float switch level will be reached and the motor will continue pumping until the pump stop delay time has elapsed. In the case that the pump runs for longer than the set maximum pump run time, the pump will turn off and at this time the 'Laufzeit' LED will turn on to let the operator know that the motor has run to its maximum run time. The warning will remain until the 'Alarm Reset' button is pressed. Pressing the 'Alarm Reset' button will then allow the pump to restart.

Double pump unit

The double pump Pumpstation Aqualift F is in standard operating mode when both control unit pump switches are set to 'Auto' and no failures or warnings are displayed.

Alternating operation

The pumps in the double pump Pumpstation Aqualift F are designed to operate alternatively. After the wastewater inside the chamber reached the pumping height, one of the pumps will turn on and pump out the entire contents of the chamber. The next time the wastewater reaches the pumping height – the other pump will turn on and pump out the entire contents of the chamber. If one of the pump malfunctions or is improperly connected the other pump will handle all pumping of the wastewater.

6. Commissioning

Parallel operation

In the case that one pump cannot handle the incoming amounts of wastewater, the second pump will also activate when the wastewater level inside the chamber has reached the 'Pump 2 On' level. Both pump will then continue to operate simultaneously until the 'Pump Off' level has been reached.

In the case that one or both of the pumps runs for longer than the set maximum pump run time, the pump(s) will turn off and at this time the 'Laufzeit' LED will turn on to let the operator know that the motor has run to its maximum run time. The warning will remain until the 'Alarm Reset' button is pressed. Pressing the 'Alarm Reset' button will then allow the pump to restart.

6.2.2 'O' Mode

When the switch for a pump is set to the 'O' setting, this pump will not operate although the warning and failure displays on the control unit will continue to function. If both switches are set to 'O' neither of the pumps will operate.

6.2. 'Hand' Mode

When the control unit is set to the 'Hand' mode the pump will begin (or continue) to run (regardless of the wastewater level inside the Aqualift F) until switched back to the 'O' or 'Auto' setting.

Attention - A pump running without water circulating through it causes increase temperatures and a drastic increase on the wear and tear of the motor. Excessive dry running of the pump(s) (above 5 minutes) can lead to irreparable damage to the pump(s). This damage is easily detectable and is not covered under the Pumpstation Aqualift F warranty.

6.3 Operational test

The functions of the Aqualift F, dependant on wastewater levels inside the unit, should be tested after installation by filling up the Aqualift F with wastewater to specific levels. Filling of the unit should take place by draining fixtures connected to the unit.

7. Inspection and maintenance

Inspection

The Pumpstation Aqualift F should be inspected monthly by the owner to make sure it is functioning properly and is water tight.

Caution !!!

Before conducting any maintenance on this unit make sure to unplug the entire unit from its power source.

All of the inspection and maintenance instruction listed below should be handled by an authorized service professional.

Repairs should only be handled by the manufacturer

Maintenance

DIN 1986 - 31 should be followed when maintaining this unit. Maintenance should be handled by an authorized professional and should include the following:

- Visual inspection of the pump and the pump pump housing / chamber
- Check for obvious wear and tear and build up of deposits on the pump
- Connection cables should be inspected for damage
- Closure valve to be tested to assure function
- Inspection chamber checked for leaks and for any build up of deposits

Scheduled maintenance should be scheduled as follows:

- ✓ Units in commercial application should be maintained every 3 months.
- ✓ Units in residential (multi-family homes) should be maintained every 6 months.
- ✓ Units in single family homes should be maintained every year.

7.1 Pump

Caution !!!

Take caution when lifting or moving the Aqualift. Additional help or a lifting device may be needed to safely remove the pumps from the chamber.

For general maintenance it is recommended (after the power source to the pump is disconnected) that the pump is removed from the chamber, placed on a firm surface and cleaned (for example using a garden hose). Only the inspection and maintenance work described in this section should be undertaken - no other work is recommended.

7.1.1 Seals (water tightness)

The seals on the rotor shaft should be inspected after the first 500 hours of pump use. After this initial inspection the seals should be checked every six months or after 1000 hours of operation, whichever comes first. The seal on the rotor between the motor and the pump is created by two floating ring seals which have a oil holding chamber between them. The condition of the floating seal on the bottom of the pump (the pumping medium side) can be checked by examining the oil. In order to complete this check, the two oil outlet plug screws have to be removed (see illustration). After removing the two oil outlet plug screws the oil can be poured into a clear glass container. If the oil is clean and clear then the lower floating ring seal is still in good condition. If the oil is milky and cloudy or this chamber contains dirty water, then this lower floating ring seal needs to be replaced. The replacement of this seal should only be handled by a qualified professional. While replacing the lower seal, the professional should also check the condition of the above seal. If the oil needs to be changed, replace with DEA SERA 32, MINOLR 32 or SHELL TELLUS 29 oil. The quantity of replacement oil need is 1.6 liters for the 120KE pumps and 1.8 liters for the 154KE pumps.

7.1.2 Macerating blades (cutting blades)

The cutting blades of the pump should be checked during the 6 month inspection or if operation of the pump becomes louder. The distance between the rotating surface and the cutting blades should be 0.1 to 0.2 mm. Setting this distance can be accomplished by loosening the 4 holding screws on the cutting blades and then adjusting the distance between the rotating surface and the cutting blades by using the cutting blade adjustment screws (quantity - 4). After the distance has been set, holding screws should be firmly tightened. These holding screws should be secured with LOCTITE 242 or WEICON AN 302-42.

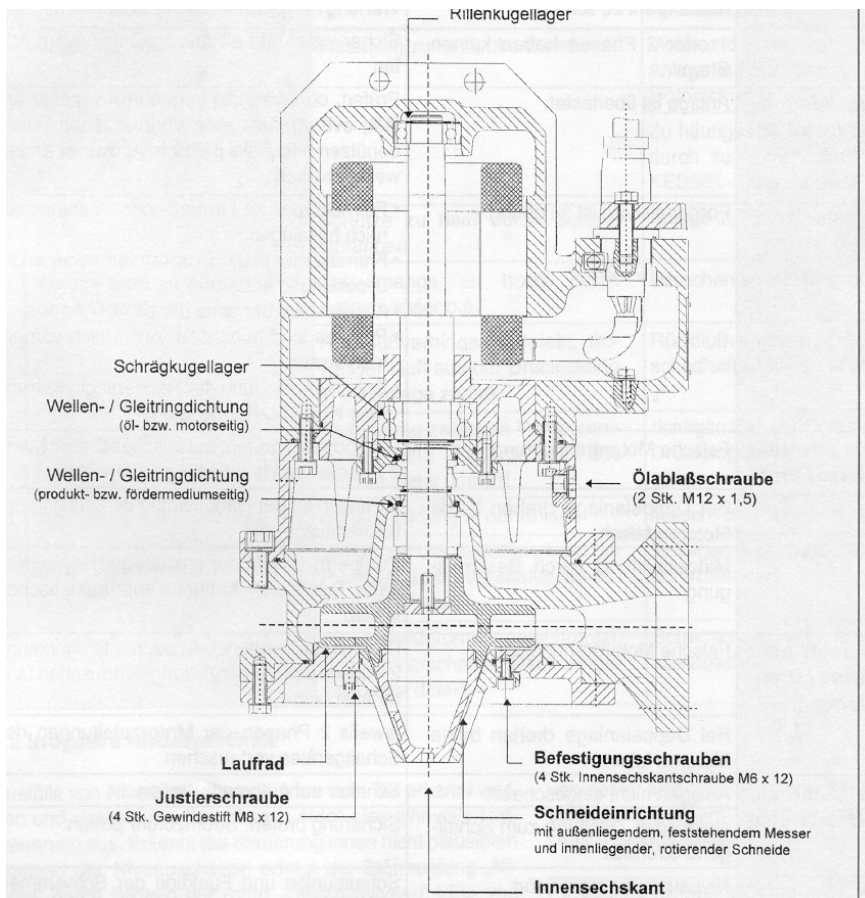
7. Inspection and maintenance

7.1.3 Bearings

The bearings are permanently lubricated and are maintenance free. However, if operation of the motor becomes louder and louder, the bearings should be inspected. This can be confirmed if the rotor is difficult to turn by hand or when turning the rotor / impeller by hand it is noticed that the rotation axis is not exact (rotor is not firmly in place).

7.1.4 Impeller

In cases where the performance of the pump decreases, the condition of the impeller should be checked for wear and tear. Before placing the Aqualift F Pumpstation in service or if the Aqualift has not been in service for an extended period of time, the impeller should be turned by hand to make sure that it rotates smoothly.



Text from Illustrations

Rillenkugellager –

Deep groove ball bearing

Schräggkugellager –

Bearings (slanted)

Wellen / Gleitringdichtung

- Rotor seals upper (motor side)

Wellen / Gleitringdichtung

- Rotor seals lower (medium side)

Laufrolle -

Impeller

Justierschraube –

cutting blade adjustment screws (quantity - 4)

Ölablaßschraube –

oil outlet plug screws

(quantity-2)

Befestigungsschrauben –

Cutting blade holding

screws (quantity-4)

Schneideinrichtung –

Exterior positioned cutting surface and interior positioned rotating cutting

7.2 Control unit

11. The batteries inside the control unit should be inspected at least once per year and replaced if necessary. Replacement batteries should be identical to the originals. Dispose of old batteries properly.
12. The motor protection switch is a wear and tear part and should be checked every year and replaced if necessary. Please replace with the identical switch and dispose of the old switch properly.
13. Please make sure the see-thru cover of the control unit is properly closed and tightened.
14. Repairs of the control unit should be undertaken by the manufacturer.

8. Problems and solutions

The following problems and solutions should only be checked and handled by a licensed professional serviceman / woman.

8.1 General problems

| Problem | Reason | Solution |
|---|---|---|
| 1. Pump does not start | Control unit switch not on 'Auto' mode | Set switch to 'Auto' setting |
| | Motor protecting switch has activated and is blocking motor | Inspect pump / impeller and remove any obstruction. |
| | Motor turns with difficulty | Customer service repair required |
| | 1 or 2 phases not receiving power | Check fuses and cable connections |
| 2. Pump(s) run but cannot handle volume of incoming wastewater | Too much wastewater entering system | Check incoming wastewater source – shut down unnecessary sources or redirect specific sources away from system |
| | Pump performance not satisfactory | <ul style="list-style-type: none"> - remove obstruction from impeller - remove obstruction from outlet pipe - make sure backflow flap is completely open - Pump(s), impeller(s) worn out and need replacement - Improper specification of system, pumps too weak to handle volumes |
| 3. Pump(s) run rough or loud and 'Phase / Drehfeld' LED does not light | Motor / Impellers rotating in wrong direction | Check rotation, switch 2 phases (cables) of main power cable |
| | With double pump system – both motors / Impellers rotating in wrong direction | Switch two phases from the main power cable on control unit. |
| | Low pump performance due to damage | Pump(s) and motor(s) to be checked and repaired by customer service if necessary |
| Pump(s) run rough or loud and 'Phase / Drehfeld' LED does not light | Motor / Impellers rotating in wrong direction | Check rotation, switch 2 phases (cables) of main motor power cable |
| | With double pump system – both motors / Impellers rotating in wrong direction | Switch two phases from the main motor cable on control unit. |
| 4. Wastewater not being pumped out of system – backwater from connected fixtures | System not turn on | Place control unit switch on 'Auto' mode |
| | Power cables to control unit not receiving power | Check fuses. Check power supply |
| | Inlet pipe(s) to Aqualift F blocked | Check and clean inlet pipes |
| | Inlet closure valves closed or not completely open | Make sure any inlet valves or locks are completely open. |
| | | |

8. Problems and solutions

| | | |
|---|--|--|
| 5. System suddenly operation very loud | Phases have been switched accidentally | Check rotation and switch rotation if necessary |
| | Pump(s) damage or cutting assembly damage | Check pump(s) and replace any damage parts |
| | Foreign object in pump | Check pump(s) / impeller(s) and remove and obstruction |
| 6. Bad odor | Pumping chamber has a leak and is no longer water / air tight | Check chamber, inlet, outlet, cable pipe for leaks |
| Sharp, biting odor | Motor(s) operating too hot | Check for free rotation of motor(s) / impeller(s) |
| | Pump(s) starting and stopping too frequently | Check with customer service |
| 7. Pump(s) running too much, starting for not reason | Incoming volume of wastewater exceeding systems capacity | Reduce incoming wastewater volume |
| | Aqualift F's backflow preventer malfunctioning – wastewater flowing back into chamber | Check and clean backflow preventer – replace if necessary |
| | Connection between base of pump and outlet pipe not watertight | Remove pump, check sealing gasket – properly replace pump and check for proper connection. Replace gasket if necessary |
| 8. Pump(s) run continuously | Foam build up inside system | Reduce use of dishwashing / clotheswashing detergents |
| | Grease / fats coating tank and pump(s) | Completely clean system – check source of incoming greases / fats and reduce or remove source |
| | Float switch set incorrectly or broken. Float switches jammed by obstruction or dirty / grease | Check float switch connections, clean and remove and obstructions. |

8.2 Irregular level conditions

Problems or failures with the level switches can often be detected by the control unit and be displayed while in the Auto mode. If the control unit detects an impossible level switch situation, the 'Laufzeit / Niveau' LED will begin to blink. This can be confirmed and cancelled by pressing the 'Alarm Reset' button if the problem has been fixed or the wastewater level has changed and this 'impossible' level is no longer present. Problems with the 'Alarm' closure switch and the opening of the 'On' level switch cannot be detected.

8. Problems and solutions

Single pump Aqualift F

- 'Pump Off' float switch which does not shut off.

In the case that the 'Pump Off' float switch does not shut off, the alarm warning will be activated when the wastewater level rises above the 'Pump On' level. The pump will turn off when the wastewater level falls below the 'Pump On' level.

- 'Pump On' float switch which does not shut off.

The alarm will activate and the pump will start when the wastewater rises above the 'Alarm On' level. Pump will turn off when the level falls below the 'Pump On' level.

- 'Pump On' float switch which is stuck in the 'On' position.

A warning will be displayed after the wastewater falls below the 'Pump Off' level. The pump will now turn on only when the wastewater level has risen above the 'Alarm' level and will turn off after the level falls below the 'Pump Off' level. The warning can be cancelled by pressing the 'Alarm Reset' button after the float switch has been repaired.

- 'Alarm' float switch is stuck in the 'On' position.

A warning will be displayed after the wastewater level has fallen below the 'Pump On' level – the warning will be a continuous (non-stop) warning. During this situation, the pump will start when the wastewater level has risen above the 'Pump On' level and will stop after the level has fallen below the 'Pump Off' level.

Double pump Aqualift F

- "Pump Off" float switch which does not shut off.

In the case that the 'Pump Off' float switch does not shut off, the alarm warning will be activated when the wastewater level rises above the 'Pump 1 On' level. Both pumps will turn on when the wastewater level rises above the 'Pump 2 On' level and will turn off when the level falls below the 'Pump 1 On' level.

- 'Pump On' float switch which does not shut off.

The alarm will activate and both pumps will start when the wastewater rises above the 'Alarm On' level. Both pumps will turn off when the level falls below the 'Pumps Off' level.

- 'Pump 2 On' float switch which does not shut off.

An alarm will activate after the wastewater level has risen above the 'Alarm' level. At the same time the second pump will start. Both pumps will continue to run until the 'Pumps off' level has been reached.

- Constantly closed 'Pump 1 On' level switch

An alarm will activate after the wastewater level has fallen below the 'Pumps Off' level. Both pumps will start again when the level reached the 'Pump 2 On' level and will both turn off when the level falls below the 'Pumps Off' level

- Constantly closed 'Pump 2 On' level switch

An alarm will activate after the wastewater level has fallen below the 'Pump 1 On' level. One pump will activate after the level rises above the 'Pump 1 On' level and the second pump will activate after the 'Alarm' level has been reached. Both pumps will turn off after the level falls below the 'Pump Off' level.

- Constantly closed 'Alarm' level switch

The 'Level' alarm will activate when the 'Alarm' level is activated AND the 'Pump 2 On' level has been reached. One pump will activate when the wastewater level reaches the 'Pump 1 On' level and the second pump will activate when the 'Pump 2 On' level has been reached. Both pumps will turn off after the 'Pumps Off' level has been reached.

8.3 Disturbances / Internal controls

The control unit continuously monitors the signals from the motor protection switches and the motor temperature sensors. In the case of a disturbance the pump will either be shut off or prevented from starting. This will result in a corresponding alarm and the lighting of an LED.

8.3.1 In the case that L2 and / or L3 fail, the 'Phase/Drehfeld' LED will continuously light and the 'Störung' relay will activate. Since the control of L1 is still active, the failure of L1 will not be displayed. In the case that the motor rotation is wrong (left) the 'Phase / Drehfeld' LED will blink.

8. Problems and solutions

In the operational mode 'Hand' it is possible to run the pump with the incorrect rotation – in all other operational modes the control unit will block the functioning of the motor in the case that the rotation is incorrect.

8.3.2 In the case that a motor protection switch is activated either manually, by a short circuit or by an overload, the 'Motorschutzschalter' LED will activate ('Pumpe . . . MSS/Temp' LED). With double pump systems the LED 'Pumpe . . . MSS/Temp' has priority over a motor / pump temperature warning.

8.3.3 Each motor of the Pumpstation Aqualift F contains two temperature sensors which send data to the control unit.

- Temperature level A (not recorded) – The 'Motortemperatur' LED blinks (with double pump units the 'Pumpe . . . MSS/Temp' LED blinks) – when temperature level A has been reached

- Temperature level B (recorded) – The 'Motortemperatur' LED turns on (continuously on) (with double pump units the 'Pumpe . . . MSS/Temp' LED blinks) – when temperature level B has been reached.

In the case that temperature level A has been reached the 'Motortemperatur' LED will blink (also 'Pumpe . . . MSS/Temp' LED with double pump units will blink) and the 'Störung' relay will activate.

Also the control unit will shut down the pumps. As soon as the pumps cool down below the specified level, the pump will return to normal operation. In the case that temperature level B has been reached the 'Motortemperatur' LED will turn on and remain on ('Pumpe . . . MSS/Temp' LED will blink with double pump units) and the 'Störung' relay will activate. Also the control unit will shut down the pumps and this failure will be recorded by the control unit and must be erased by pressing the 'Alarm Reset' button. This is only possible when the temperature sensors sense a normal operating temperature. In the case of a power outage, the 'Temperature B' information will not be recorded. In the case that the 'Temperature B' level has been reached and the wastewater level has reached the 'Alarm' level – the following can be performed:

- By pressing the 'Alarm Reset' button once, the internal signal will be cancelled.
- By pressing the 'Alarm Reset' button twice, the 'Temperature B' will be erased.

8.4 Failure warnings

Failure warnings will occur by:

- the activation of the failure relay and the connected warning device
- display of the type of failure by LEDs on the control unit resulting from

| Single pump units | Double pump units |
|---------------------------|---------------------------|
| Phase / rotation problems | Phase / rotation problems |
| Motor protection switch | Pump 2 MSS/Temp |
| Motor temperature | Pump 1 MSS/Temp |
| Running times / level | Running times / level |

8.5 'Alarm' warnings

Alarm warnings occur from:

- the activation of the Alarm relay and the connected warning device
- the internal signal

Two situations can result in an alarm warning:

1. The wastewater level inside the chamber rises above the level of the 'Alarm' float switch. The internal audible alarm can be turned off by pressing the 'Alarm Reset' button. As soon as the wastewater has fallen below the 'Alarm' float level both alarms (signal and relay) will be cancelled.

2. If a loaded battery is placed in the control unit, an audible alarm will be activated in the case of a power failure. This audible alarm will continue for up to 3 hours depending on the power in the battery. This alarm can be cancelled by pressing the 'Alarm Reset' button.

8.6 What to do when

- The motor protection switch is activated - Open the transparent cover of the control unit and press the 'START' button. If the motor protection switch reactivated immediately after being pressed please contact a licensed electrician.
- The Aqualift F no longer reacts to incoming signals (for example from the float switches) - unplug the control unit of the Aqualift F for at least 10 seconds and then plug back in. In the case that the Aqualift still no longer response to incoming signal please contact a licensed professional.

9. Control unit

9.1 Control unit for single pump pumpstation Aqualift F

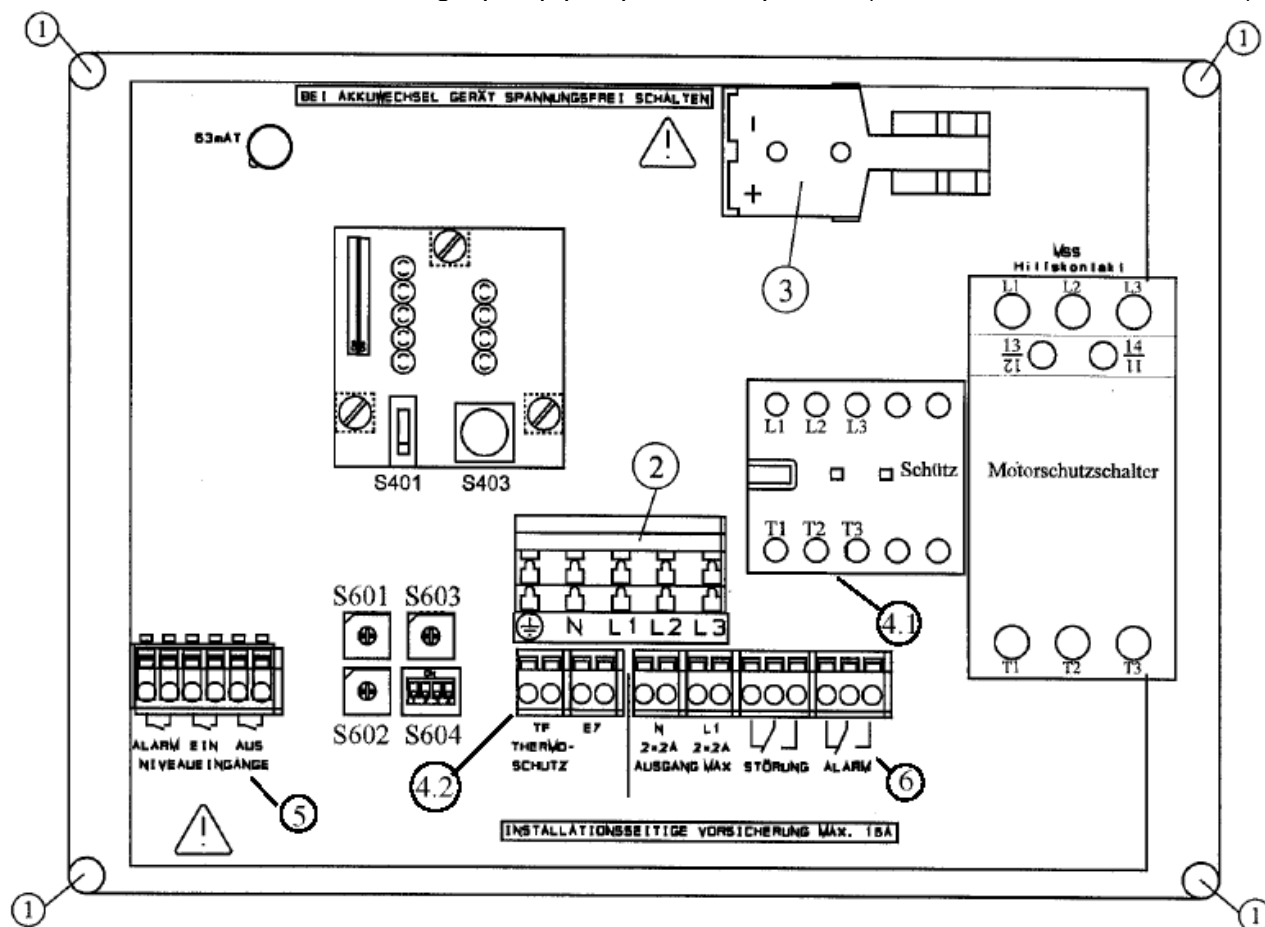
9.1.1 Description of displays and operational button on control unit

| Normal operation Information for User | Betrieb | green | power supply functioning |
|--|-------------------------|-----------------------------------|--|
| | 'Alarm' level | yellow | 'Alarm' level reached |
| | 'On 2' level | yellow | pump 2 on level reached |
| | 'On 1' level | yellow | pump 1 on level reached |
| | 'Off' level | yellow | Pump off level reached |
| | Pump1 | green | pump outlet 1 activated |
| | | | |
| Warnings Information for Tradesman | Phase | red | constant - phase not active blinking - rotating field problem |
| | Motor protection switch | red | Motor protection switch has been activated |
| | Motor temperature | red | Constant – 'Temperature B' (E7) Blinking – 'Temperature A' (TF) |
| | Running time/level | red | constant - running time failure blinking - level failure |
| Buttons | | | |
| Hand - 0 - Auto (Pump 1) | Rotating switch | Chooses mode of operation | |
| Alarm reset | button | Turns off alarm from level switch | |
| | | Turns off level failure alarm | |
| | | Turns of motor temperature alarm | |
| Motor protection switch1 | switch | Activated when pump overloads | |

- The control buttons can be accessed by removing the transparent cover of the Aqualift F control unit. The cover should only be removed and the control buttons accessed by a licensed professional.
- During the time that the transparent control unit cover is removed, the control units protection class is reduced. In the case that a humid condition or splashing water may be present - first unplug the control unit before removing the transparent cover.
- The current for the motor protection switch must be set appropriately according to the requirements of the motor and must not be set or changed by the operator / owner.
- Be sure that the transparent cover is properly replaced and secured so that the proper protection class is ensured.

9. Control unit

9.1.2 Interior of control unit for single pump pumpstation Aqualift F (schematic / not dimensioned)



1. Holes in interior of control unit for wall mounting with screws
2. Jacks for power connection
3. Location for battery (available as accessory)
- 4.1 Jacks for motor (pump)
- 4.2 Jacks for temperature control cables for motor (pump)
5. Jacks for float switches
6. Jacks for warning and alarm connections

Text from the illustration:

Bei Akkuwechsel Gerät spannungsfrei schalten = Unplug control unit before changing batteries

Schutz = Protection

Motorschuttschalter = Motor protection switch

Alarm ein / aus = Alarm on / off

Niveaueingänge = Float switch cables

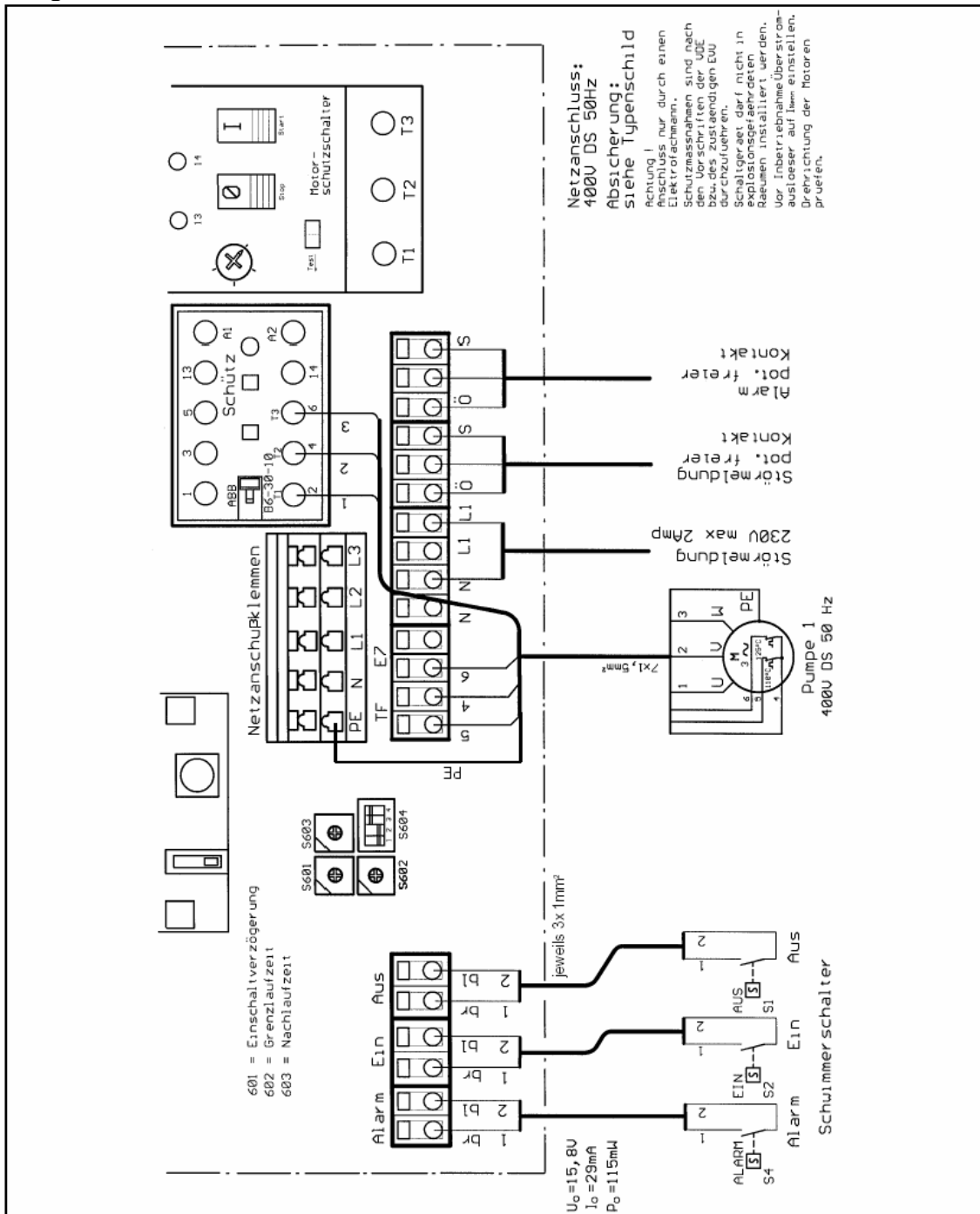
Thermoschutz = Thermal protection

Ausgang = Output Max Störung = Problem Alarm = Alarm

Installationsseitige Vorsicherung = On-site fuse Max 16 Amp

9. Control unit

9.1.3. Single unit



Stand 05.99 / Du / EINZ-F

Text from the illustrations:

601 = Pump start delay time

602 = Max running time

603 = Pump stop delay time

Alarm Ein Aus = On Off

Jeweils 2x 1mm² = 2 x 1mm² each

Schwimmerschalter = Float switches

Netzanschlussklemmen = Power jacks

Schutz= Protection

Pumpe = Pump

Motorschutzschalter = Motor protection switch

Störmeldung = Warning notice

Pot. Freier Kontakt = potential free contact

Netzanschluss = Power Connection

Absicherung: siehe Typenschild = Safety / Fuse-see

Achtung!... = Caution! Connection only to be made by a licensed professional electrician

Follow VDE and EVU protection guidelines

Control units should not be installed in rooms / areas which present an explosion risks

Before starting, set overload switch to I_{enn} setting

Check rotation of pumps

9. Control unit

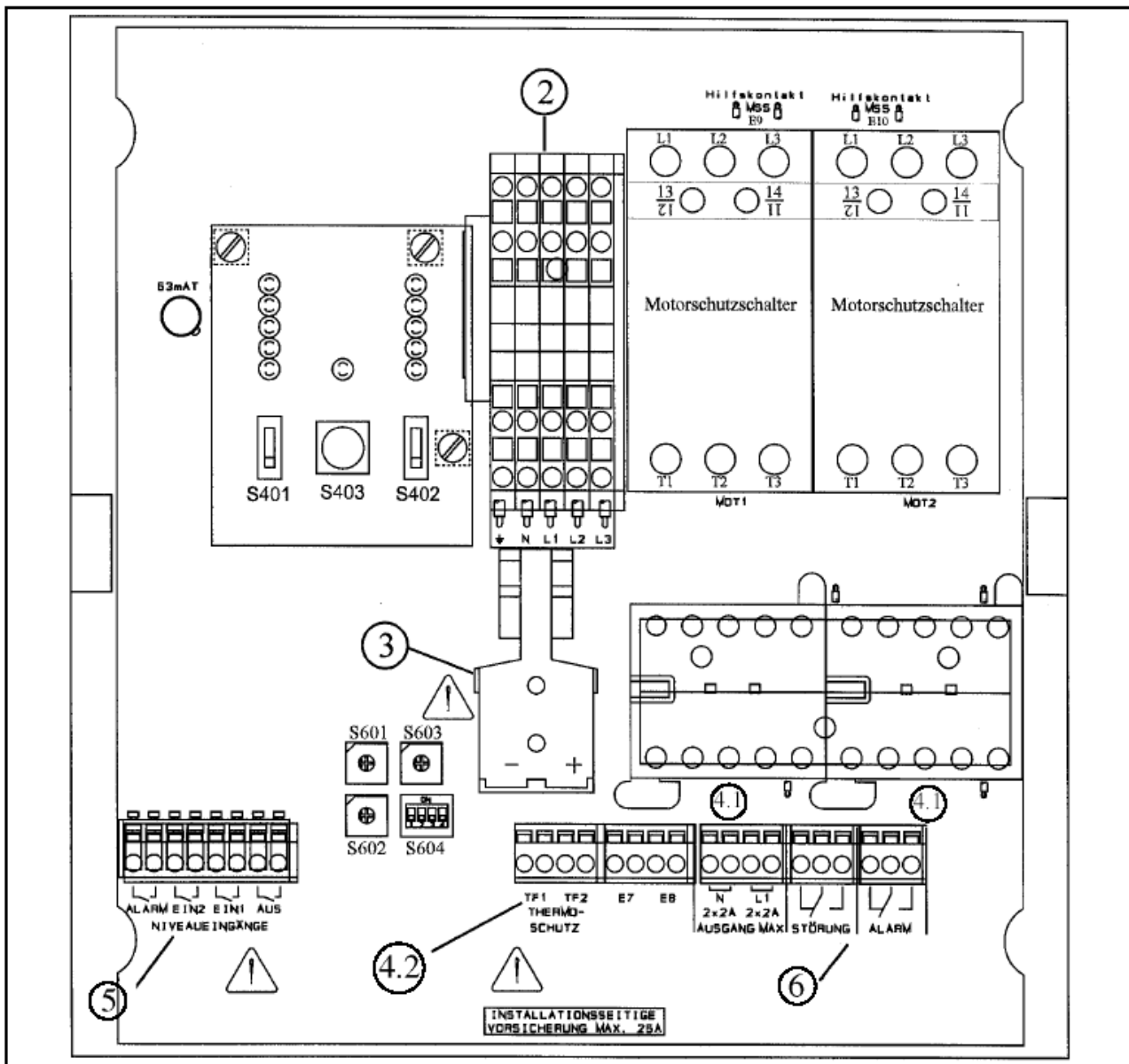
9.2 Control unit for double pump pumpstation Aqualift F

9.2.1 Description of displays and operational button on control unit

| Normal operation Information for User | Betrieb | green | power supply functioning |
|--|--------------------|-----------------------------------|---|
| | 'Alarm' level | yellow | 'Alarm' level reached |
| | 'On 2' level | yellow | pump 2 on level reached |
| | 'On 1' level | yellow | pump 1 on level reached |
| | 'Off' level | yellow | Pump off level reached |
| | Pump1 | green | pump outlet 1 activated |
| | Pump2 | green | pump outlet 2 activated |
| Warnings Information for Tradesman | Phase | red | constant - phase not active blinking - rotating field problem |
| | Pump 2 MSS/Temp | red | constant - Pump 2 motor protection switch activated blinking - Pump 2 thermal switch |
| | Pump 1 MSS/Temp | red | constant - Pump 1 motor protection switch activated blinking - Pump1 thermal switch |
| | Running time/level | red | constant - running time failure blinking - level failure |
| Buttons | | | |
| Hand - 0 - Auto (Pump 1) | Rotating switch | Chooses Pump 1 operating type | |
| Hand - 0 - Auto (Pump 2) | Rotating switch | Chooses Pump 2 operating type | |
| Alarm reset | button | Turns off alarm from level switch | |
| | | Turns off level failure alarm | |
| | | Turns of motor temperature alarm | |
| Motor protection switch 1 | switch | Activated when pump overloads | |
| Motor protection switch 2 | switch | Activated when pump overloads | |

- The control buttons can be accessed by removing the transparent cover of the Aqualift F control unit. The cover should only be removed and the control buttons accessed by a licensed professional.
 - During the time that the transparent control unit cover is removed, the control units protection class is reduced. In the case that a humid condition or splashing water may be present - first unplug the control unit before removing the transparent cover.
 - The current for the motor protection switch must be set appropriately according to the requirements of the motor and must not be set or changed by the operator / owner.
- Be sure that the transparent cover is properly replaced and secured so that the proper protection class is ensured.

9. Control unit



1. -
2. Jacks for power connection
3. Location for battery (available as accessory)
- 4.1 Jacks for motor (pump)
- 4.2 Jacks for temperature control cables for motor (pump)
5. Jacks for float switches
6. Jacks for warning and alarm connections

Text from the illustrations:

Motorschuttschalter = Motor protection switch

Alarm Ein2 Ein1 Aus = Alarm On2 On1 Off

Niveaueingänge = Float switch inputs

Thermoschutz = Thermal switch

Ausgang = Outlet

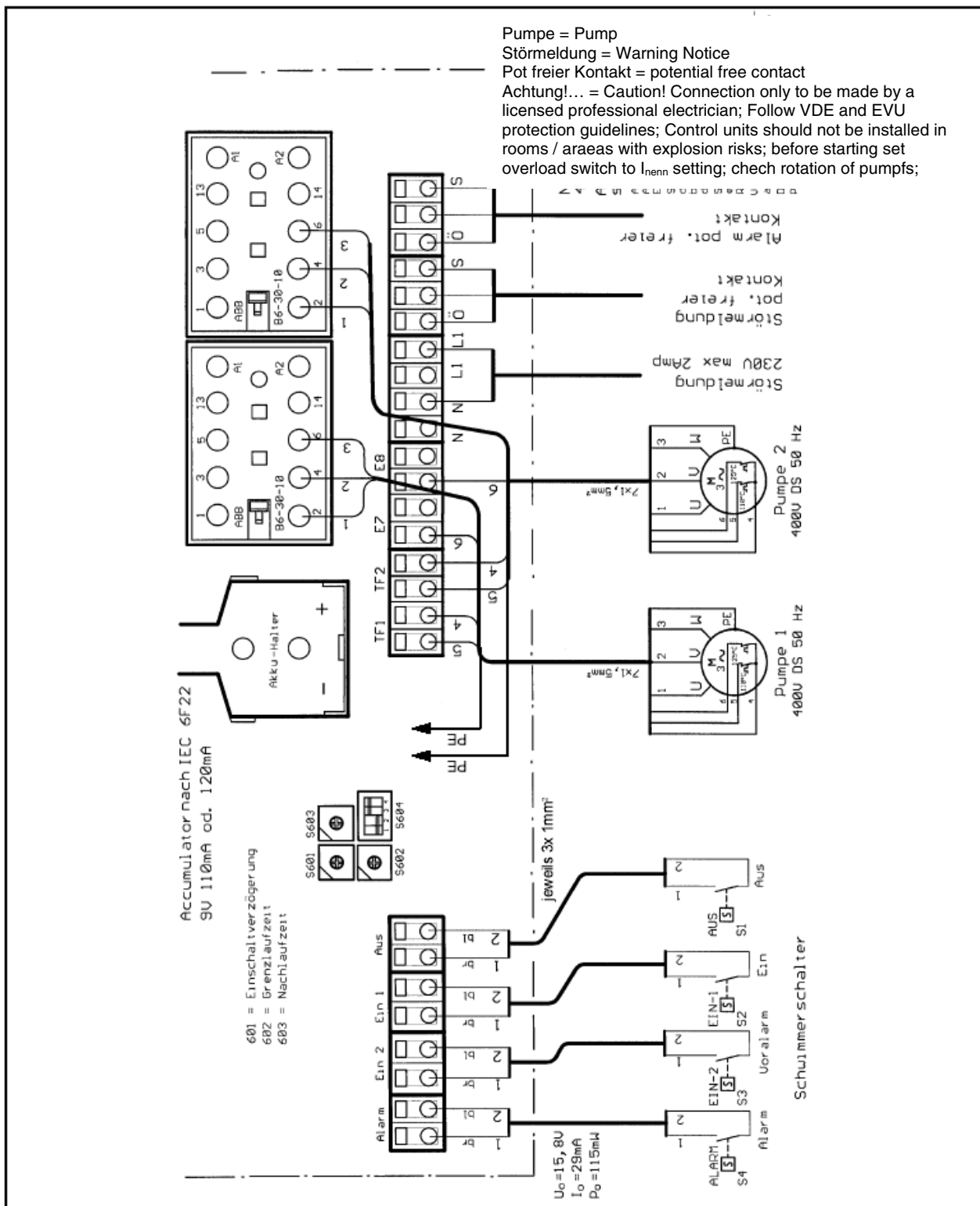
Störung = Warning

Alarm = Alarm

Installationsseitige Vorsicherung Max . 25A = On-site fuse Max 25 Amp

9. Control unit

Text from the illustrations:



Accumulator nach IEC = Accumulator according to IEC 6F22

Akku-Halter: Battery housing

Einschaltverzögerung: Pump start delay time

Grenzlaufzeit: Max running time

Nachlaufzeit: Pump stop delay time

Alarm = Alarm

Voralarm = Pre-Alarm

Schwimmerschalter = Float switches

Ein / Aus = On / Off

10. Replacement parts

| Replacement part Group | Part | Number |
|-------------------------------|--|---------|
| Sewage pump | Type TPF 120 KE | 185-172 |
| | Type TPF 154 KE | 185-173 |
| Pressure outlet | 90mm OD single pump pressure fitting | 185-174 |
| | 63mm OD single pump pressure fitting | 185-238 |
| | 90mm OD double pump pressure fitting | 185-196 |
| | 63mm OD double pump pressure fitting | 185-239 |
| | Pump seal | 185-183 |
| | Lead pipe holder / clip(end piece) | 185-216 |
| | Lead pipe double holder (middle piece) | 185-264 |
| | PEHD-holder for lead pipe extension | 185-194 |
| | Lead pipe (sold per meter) | 185-273 |
| | Anti-return ball-valve | 185-179 |
| | Ball-valve | 185-217 |
| | Float switch | 185-164 |
| | Float switch holder / clamp | 185-169 |
| | Steal chain (sold per meter) | 185-182 |
| | Hook for chain | 185-181 |
| | Control unit for single pump TPF 120 KE | 185-178 |
| | Control unit for single pump TPF 154 KE | 185-186 |
| | Control unit for double pump TPF 120 KE | 185-187 |
| | Control unit for double pump TPE 154 KE | 185-188 |
| | Control unit single pump no motor protection Switch | 185-189 |
| Electical control unit | Control unit double pump no motor protection switch | 185-190 |
| | Motor protection switch for TPF 120 KE (2.5 Amps) | 185-269 |
| | Motor protection switch for TPF 154 KE (4.4 Amps) | 185-270 |
| | Protection | 185-271 |
| | Batteries (accessorie) | 20230 |
| | | |
| Pump chamber parts | see KESSEL sales catalog | |

11. Guarantee

1. In the case that a KESSEL product is defective, KESSEL has the option of repairing or replacing the product. If the product remains defective after the second attempt to repair or replace the product or it is economically unfeasible to repair or replace the product, the customer has the right to cancel the order / contract or reduce payment accordingly. KESSEL must be notified immediately in writing of defects in a product. In the case that the defect is not visible or difficult to detect, KESSEL must be notified immediately in writing of the defect as soon as it is discovered. If the product is repaired or replaced, the newly repaired or replaced product shall receive a new warranty identical to that which the original (defective) product was granted. The term defective product refers only to the product or part needing repair or replacement and not necessarily to the entire product or unit. KESSEL products are warranted for a period of 24 months. This warranty period begins on the day the product is shipped from KESSEL to its customer. The warranty only applies to newly manufactured products. Additional information can be found in section 377 and 378 of the HGB.

2. Wear and tear on a product will not be considered a defect. Problems with products resulting from improper installation, handling or maintenance will also not be considered a defect.

01.01.2002

Important contacts / Info

| | |
|---|----------------------------------|
| Type | _____ |
| KESSEL Order Number | _____ |
| Production Date | _____ |
| Project description / Building services supervisor Address Telephone / Fax | _____ _____ _____ _____ |
| Planner Address Telephone / Fax | _____ _____ _____ |
| Contracted construction company Address Telephone / Fax | _____ _____ _____ |
| Contracted plumbing company Address Telephone / Fax | _____ _____ _____ |
| Contracted electrical company Address Telephone / Fax | _____ _____ _____ |
| System operator Address Telephone / Fax | _____ _____ _____ |
| Other remarks | _____ |

The system operator, and those responsible, were present during the commissioning of this system.

Place and Date

Declaration of EC-Conformity

according to machine guide line 89/392/EWG of 14.06.1989 and modification guidelines 91/368/EWG of 20.06.1991, 93/44/EWG of 19.07.1993 and 93/68/EWG of 22.07.1993, low-voltage guideline 73/23/EWG and guideline regarding electromagnetic compatibility 93/97/EWG of 29.10.1993

The producer

KESSEL GmbH, D-85101 Lenting

confirms that the product

**KESSEL *Aqualift*[®] F pumping station
for underground / sub-surface installation**

was developed and produced
in accordance with the following norms:

**EN 292
VDE 31001
VDE 0113
EN 55082-2
EN 55011
EN 55014
EN 60335**

Lenting, 01.01.1999



B. Kessel



G. Vanetta

Everything for drainage



- Backwater valves and cleanouts
- Polymer and cast iron drains
- Volatile liquid traps
- Lifting stations, pumps, warning and control units
- Rainwater management systems
- Grease separators
- Oil/fuel and coalescence separators
- Inspection chambers
- Custom projects for industrial applications